MINDING ANIMALS, MINDING EARTH: OLD BRAINS, NEW BOTTLENECKS

by Marc Bekoff

Abstract. I emphasize the importance of broadening behavioral, ecological, and conservation science into a more integrative, interdisciplinary, socially responsible, compassionate, spiritual, and holistic endeavor. I stress the significance of studies of animal behavior, especially ethological research concerned with animal emotions in which individuals are named and recognized for their own personalities, for helping us to learn not only about the nonhuman animal beings with whom we share Earth but also about who we are and our place in nature. We are best understood in relationship with others. To this end I develop the notions of "minding animals" and "deep ethology." Animals are sources of wisdom, a way of knowing.

We are all citizens of Earth, members of a global community in which intimate reciprocal and beneficent peaceful relationships are mandatory. A world without cruelty and with boundless compassion, respect, grace, humility, spirituality, and love would be a better world in which to live. We have compelling responsibilities for making Earth a better and more peaceful habitat for all beings. It is essential that we do better than our ancestors. We must reflect and step lightly as we "redecorate" nature. Time is not on our side.

I plead for the development of heartfelt and holistic science that allows for joy and play. Science need not be suspicious of things it cannot fully understand. We must not avert our eyes or other senses from the eyes and voices of other beings who urgently need our uncompromising and unconditional aid and love. We can do much more than we have done for animals and the Earth.

Keywords: animal cognition; animal emotions; animal play; cooperation; deep ethology; fairness; forgiveness; minding animals; nature's wisdom; social morality.

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The earth is, to a certain extent, our mother. She is so kind, because whatever we do, she tolerates it. But now, the time has come when our power to destroy is so extreme that Mother Earth is compelled to tell us to be careful. The population explosion and many other indicators make that clear, don't they? Nature has its own natural limitations. . . .

A clear distinction should be made between what is not found by science and what is found to be non-existent by science. What science finds to be non-existent, we must accept as non-existent; but what science merely does not find is a completely different matter. . . . It is quite clear that there are many, many mysterious things. (His Holiness the Dalai Lama 1999, 197, 9)

I believe that at the most fundamental level our nature is compassionate, and that cooperation, not conflict, lies at the heart of the basic principles that govern our human existence. . . . By living a way of life that expresses our basic goodness, we fulfill our humanity and give our actions dignity, worth, and meaning. (His Holiness the Dalai Lama 2002, 68)

If we don't always start from Nature we certainly come to her in our hour of need. (Miller 1957, 93)

I believe that the true, fundamental relationship between humans and the natural world is one of wonder, beauty, and intimacy. (Berry 2000, 93).

When human beings lose their connection to nature, to heaven and earth, then they do not know how to nurture their environment or how to rule their world—which is saying the same thing. Human beings destroy their ecology at the same time they destroy one another. From that perspective, healing our society goes hand in hand with healing our personal elemental connection with the phenomenal world. (Trungpa 1988, 125)

There is a basic goodness in nature. The sun shines. Flowers give fragrance and colour. Fruit gives nourishment. Fire gives warmth. Rain irrigates. There is even simple beauty in winter, death and decay. Nature being red in tooth and claw is a misconception. There is more exuberant beauty in Nature than there is cruelty . . . there is enough in the world for everybody's need, but not enough for anybody's greed. (Kumar 2000, 3)

The Path to Nature's Wisdom: A Kaleidoscope of Radiant Sensuality

No one on Earth can ignore the devastating effects of human beings on Earth, and none of Earth's beings or habitats, including water and air, is exempt from our actions. Thinking about "the path to nature's wisdom"[1] requires us to take a very broad perspective on a variety of questions. Areas of concern include asking questions about what science is and how science is conducted, assessing the importance of wide-ranging holistic interdisciplinary discussion that transcends more narrow concerns, figuring out how common sense and "science sense" are reconciled, and, most important, asking what the roles are of compassion, kindness, generosity, respect, grace, humility, and love in what we call *science*. Surely we can do much better than we have in our encounters with nature and Earth if we strive for a more comprehensive, respectful, and compassionate Earth ethic.

Of course, these are only a few among many questions that need to be considered, and any answers that are offered will necessarily be tentative and open to future revision. Nonetheless, these challenging and often frustrating questions must be dealt with now, for any delay will result in more devastation of Earth. As His Holiness the Dalai Lama reminds us, Mother Earth is telling us—actually warning us—to be careful about how we interact with and use her. Thomas Berry stresses that our relationship with nature should be one of awe, not one of use. I agree.

The quotation above from Henry Miller rings true for me and for many others. But why do we go to nature for guidance? Why do we feel so good when we see, hear, smell, and touch other animals, when we look at trees and smell the fragrance of flowers, when we watch rushing water in a stream, lake, or ocean? We often cannot put into words why nature has such positive effects on us—why when we are immersed in nature we become breathless, we place a hand on our chest and feel our heart rate slow because of nature's beauty, mystery, simplicity, multiplicity, and generosity. But just because we cannot utter words about the effect nature has on us does not mean that she does not have an effect, for clearly she does. Perhaps our inability to express it simply means that the feelings that are evoked are so very deep (perhaps primal) that there are no words rich enough to convey what we feel. We usually feel joy when we know that nature is doing well and deep sorrow and pain when we perceive that nature is exploited and destroyed. I ache when I feel nature's wisdom being compromised and forced out of balance. My primitive brain, immersed in new and rapidly developing cultures and technologies, retains close ties to nature. Perhaps the sheer joy we feel when nature is healthy, when we are embedded in nature's mysterious ways, is but one measure of the love we have for her.

Old Brains in New Sociocultural Milieus

Regardless of why, Miller is correct: we often seek nature when we feel out of balance, when something does not feel right. "We need the wonder of the dawn, the wonder of the forest, the wonder of a river, the wonder of a prairie" (Berry 2000, 97). A recent survey has shown that 70 to 90 percent of the general public who were questioned in Europe and in the United States "recognize the right of nature to exist even if not useful to humans in any way." Nature has a right to be protected. Whether nature has her own inherent wisdom that is at the same time emergent and shared, a wisdom that interacts with our own expectations of what nature is all about, or whether we project and imbue nature with such qualities for one reason or another and she is really just a state of our own mind, I find that I am never alone, and neither do I feel lonely, when I am "out in nature." I converse with nature, and she converses with me.

There must surely have been significant consequences for our ancestors when they "fooled" with Mother Nature. They did not have all of the mechanical and intellectual machinery with which to work to undo their intrusions into natural processes. Indeed, they were probably so busy just trying to stay alive that they could not possibly have wrought the havoc that subsequent generations have wrought on Earth. It would be wonderful if we could tune in to our old (some might say "primitive") brains and let them guide us, for our brains are very much like those of our ancestors, but our sociocultural milieus and Earth have changed significantly over the last millennia. Cycles of nature are still with us and within us, although we might not be aware of their presence because we can so easily override just about anything "natural" with technology and by keeping busy. Much technology and much useless busyness causes alienation from nature, and this rupture in turn leads to the wanton abuse of Earth. It is all too easy to destroy something to which we are not attached or to abuse another being to whom we are not bonded.

When I think about nature's wisdom I am forced into coming to terms with who I am in the grand scheme of things. While I usually come to the conclusion that I am very small in a very large world, this does not diminish me or make me feel a lesser being. Indeed, realizing that I am minute in an enormous world frees me and envelops me in much peace, and I rejoice in who I am in the grand scheme of things—nature's random processes, predictable rhythms, and all. When I am immersed in nature I feel her warmth deep in my heart, and all of my senses tingle with her beauty and sensuality. The sights, sounds, odors, and touches of nature are there for everyone to notice: they say "hello" and invite us to enjoy and partake in her splendor. I often feel that nature's wisdom is so very simple and that she truly wants us to receive her messages and to resonate with them. When we give her respect, compassion, and love, she returns them in abundance. And when we give her respect, compassion, and love, it is easy to feel a deep sense of unity as part of an integrated community of friends in which past, present, and future stand next to one another, are intimately interconnected in space over time. I feel animals talk to me, trees talk to me, rushing water talk to me, even rocks and the very ground on which I am walking talk to me. There is a kaleidoscope of radiant sensuality surrounding and entering them, a cacophony of nature's music just waiting, perhaps longing, to be experienced by all.

Bernie Krause (2002) refers to the sounds of natural habitats and living organisms as the most beautiful music on the planet, its collective voice. We must beware of losing nature's voice. We must beware of suffering not only maladies associated with "silent springs" (Carson 1962) but also the ailments and psychological damage associated with silent summers, autumns, and winters. Let us not silence nature's voices. The wrong path to tapping into nature's wisdom is to disrupt the precious lives of other ani-

mals and silence their voices, or to prevent leaves from blowing in the breeze, or to impede water from sloshing about. I study animals, and I want there to be places on Earth where animals can be safe from harm caused by humans. In an action displaying true human wisdom, the country of Mexico recently signed an accord to protect whales in its waters. It will be in the largest sanctuary in the world, about 1.1 million square miles of water. Sadly, and unwisely, refuges do not always protect animals. On Cape Cod, Massachusetts, there is a wildlife refuge on Momomoy Island, where animals are supposed to be protected from human disturbance, but where numerous coyotes are routinely killed. Some refuge! In the United States, animals can be hunted on so-called national refuges. Surely, if we do not protect animals in areas where they are supposed to be able to live their lives in safety, we risk losing their voices, nature's sounds.

WHAT IS WISDOM?

"No people ever knew the Earth as well as we do in terms of its mechanistic processes, but no people have ever had less intimacy with the planet. We are shriveled up in our souls" (Berry 2000, 95).

What do we mean by *nature's wisdom*? Anton Moser (2000, 381) has introduced a new term, "eco-sophy," to refer to "the science of Nature's wisdom . . . ," the core of an ecological, holistic worldview. His approach is interdisciplinary, multi-level, and necessarily wide-ranging, and many people will likely find it extremely challenging, even perhaps daunting and intimidating in its breadth. Moser brings to the table a holistic, macroscopic, integrated view in which the notion of wisdom includes the importance of intuition, sustainability, diversity, flexibility, self-organization, integration ("deep science," in which science, ethics, and art are integrated with nature), unity (nature is an interconnected, interdependent, and embedded whole), aesthetics, and spiritual and emotional dimensions (rather than a reliance on solely experimental data), science integrated with ethics, and the use of noninvasive manipulations that respect "a feeling for other creatures" (2000, 375) when we study nature. Thus, nature is seen as a whole, and an "Earth ethics" demands that we not intrude on the integrity of deeply interrelated natural processes. Nature is a source of happiness, joy, and beauty, and beauty is the overall indicator of the quality of the wholeness of nature, the glory of the whole. The importance of sensory experience is stressed in Moser's conceptualization of nature's wisdom, as is active participation in the world in which we are immersed. Our lives should be "senseful" rather than "senseless." Nature is more than logical, physical, materialistic, mechanistic, and mathematical principles and laws.

When I looked up the word *wisdom* in the *Oxford English Dictionary* and in a thesaurus I found the following: "goodness of judgment," "erudition," "clever," "knowledge of a higher kind," "judging rightly in matters

relating to life and conduct," "prudence," "discretion," "insight," "sensible," "common sense," "tact," "intelligence," and "understanding." I wondered how each might inform a discussion of the topic with which we are concerned, The Path to Nature's Wisdom. What I see is that talking about nature's wisdom suggests that nature seems to understand herself and her rhythmic dance through space and time, although this understanding might not be obvious in a narrow-minded or short-term view; that perhaps there is some self-organizing principle that applies to the concept of nature, taken broadly; and that in the short amount of time that each of us is on Earth we cannot possibly understand or appreciate the underlying dynamics that have allowed nature to persist for millennia, no matter how wise we are as individuals and no matter how extensive our collective wisdom. One of my colleagues has expressed concern that talking about "nature's wisdom" is an anthropocentric exercise and that we need to be very careful when we discuss what we mean by nature's wisdom. I agree, but I also believe that it is a very useful way to speak about nature.

While the challenge of achieving a deep comprehension of nature's wisdom might be frustrating and cause some people to give up trying, I find the challenge to be inviting, because in attempting to come to terms with nature's wisdom I feel that we can make our planet a better place for all beings, for all life, and for all environs, animate and inanimate. I feel that we can come to terms with the "big picture" in which every event is interconnected, in which we take a holistic view of Earth as a community of subjects rather than a mere collection of objects, to borrow a phrase from Berry. Berry stresses that no living being nourishes itself; each is dependent on every other member of the community for the nourishment and the assistance it needs for its own survival.

Earth as a Wise Elder

> We are not alone on this planet, even though our behavior at times suggests otherwise. The manic pace of our modern lives can be brought into balance by simply giving in to the silence of the desert, the pounding of a Pacific surf, the darkness and brilliance of a night sky far away from a city. . . . Wilderness is a place of humility. Humility is a place of wilderness. . . . The eyes of the future are looking back at us and they are praying for us to see beyond our own time . . . that we might act with restraint, that we might leave room for the life that is destined to come. . . . Wild mercy is at our hands. (Williams 2001, 180–81, 215)

> Something almost unspeakably holy—I don't know how else to say this—underlies our discovery and confirmation of the actual details that made our world and also, in realms of contingency, assured the minutiae of its construction in the manner we know, and not in any of the trillion other ways, nearly all of which would not have included the evolution of a scribe to record the beauty, the cruelty, the fascination, and the mystery. (Gould 2002, as quoted in *The New York Times*, 23 May 2002, B9)

"You have to look at the data closely," the man said, "and think about the science, but when you get up the North Slope [of Alaska], you'll hear those caribou go thundering past, and you'll get this gut feeling that you just can't ignore." (Streever 2002, 184)

Humans are very much an integral part of nature. So are all other living beings, bodies of water, the air we breathe, and inanimate things; nature is all. Every being, every thing, is integrated into a seamless tapestry characterized by deep and reciprocal interactions with short-term and long-term consequences, detectable and undetectable, "good" and "bad."

Humans clearly have altered the future of biological evolution. As such, we are losing nature and her wisdom at alarming rates, and most extinctions go unrecognized. The natural rate of extinction is an estimated one species per one million species per year. Extinctions attributable to humans range from about one hundred to one thousand species per million per year. About one new species per million species is born each year. Do the math: this is not a good situation at all, for far fewer species are born than go extinct as a result of human activities. There have been five past mass extinctions, and we are in the middle of the sixth major period of biotic extinction, caused predominantly by human activities. In the past five extinctions it took about 10 million years to restore biodiversity; now there may be no coming back because of increased rates of extinction. As many as 250,000 species went extinct in the twentieth century, and as many as ten to twenty times that are likely to disappear in the twenty-first century. In North America alone about 235 animal species that we know of are threatened by pollution, human encroachment on their habitat, and aggressive harvesting practices. Michael McKinney (2001) has discovered that human population size is positively correlated with threat to the numbers of birds and mammals for continental (but not island) nations and that mammals suffer more losses than birds during initial human impacts. His data set is convincing; 149 nations were analyzed for mammals and 154 for birds.

Perhaps if we view Earth as a wise elder and listen to her messages and watch her very closely, as do many indigenous peoples, we will be able to tap into a deeper understanding of her grand wisdom, a combination of complex and simple processes that she shares openly and generously. I often wonder whether indigenous peoples who live in deep interrelationship with Earth are able to solve problems that more detached scientists cannot. For example, Firket Berkes (1999) stresses the importance of giving serious attention to traditional ecological knowledge and provides many examples of how Western science cannot deal with many "local" problems that they encounter in foreign lands. He notes, for example, that scientists did not know that there was a population of eider ducks that lived year-round in Hudson Bay, but the Inuits did. The Inuits' knowledge was for a long time ignored in summaries of the avifauna in this area because it was

not "scientific." Likewise, the Inuits' observations and warnings about global warming are beginning to be taken more seriously by non-native scientists, who usually have a narrower and shorter-term view of the situation at hand. According to a story in the *Washington Post* (28 May 2002), the average temperature in Canada's Western Arctic has increased between 1.5 degrees Celsius to 13.5 degrees Celsius, and native Inuits "cannot read the weather the way they used to." Inuit hunters and elders who depend on the land are seeing increasing numbers of deformed fish and caribou with diseased livers. Recently, a robin was seen where none had ever been observed; there is no word for "robin" in the Inuit's language, Inuktitut. Likewise, insects that had never been seen before are appearing, and similarly there is no word for them in Inuktitut.

Berkes warns that visiting scientists often have a "seasonally limited research period," and they cannot possibly learn about the long-term details needed to make substantive claims about ecological problems. In the Keoladeo National Park in India, local people argued for years that grazing by water buffalo should be allowed because it was consistent with conservation objectives. Park authorities disagreed. A long-term study by the Bombay Natural History Society supported the locals' claim. Grazing helped counter the tendency of the wetland to turn into grassland. A ban on grazing had negatively affected the wetland and the park, which was well known for its rich bird life. Grazing by cattle was an effective solution. In some, possibly many, cases, traditional knowledge and wisdom should be viewed as being equivalent to "scientific" knowledge, because traditional knowledge often results from systematic observations and inquiries over long periods of time, without all the authority issues and arrogance of "science."

Perhaps if we listen to nature we will make peace with our own selves and with others and, as a result, move toward a unified community in which trust, happiness, peace, and love prevail over distrust, sadness, unrest, and hate. Sowing seeds for world peace among children is a must, and animals can help us in this venture. Trust is critical, for in the absence of trust we cannot move forward with a strong sense of security and unity. I offer that we must "wage peace" with abandon and enthusiasm among all human beings, all nonhuman animal beings (animals), and nature as a whole. In our tumultuous world many alienated persons crave deep and reciprocal interconnections with one another and with other nature. But first we must each be content as individuals and at peace with ourselves. We surely can be part of nature's wisdom if we allow ourselves to be.

Animals as a Path to Nature's Wisdom

There are innumerable ways to interconnect with nature. None is necessarily better than the others, and each brings joy, pleasure, peace, and in-

tense and immense splendor and awe. Those of us who love and study animals often claim that we have a unique and deep interconnection, but so do those human beings who love trees, rocks, bodies of water, and the very air we breathe. There are many ways in which humans connect with nature when we "redecorate" and all too often harm her, but I want to concentrate on the more positive ways in which we connect with nature and tap into her deep wisdom. Perhaps in the future there will be studies of the neurobiology of experiencing wisdom as there are studies of the neurobiology of spirituality and religion (a new field called *neurotheology*).

I am a very lucky man. I live in a beautiful area of the world and spend much of my time outdoors studying various animals. I am fortunate to be able to ride, hike, or ski to the University. For more than two decades I have lived in the mountains outside of Boulder. I willingly share the surrounding land with many animals—coyotes, mountain lions, red foxes, porcupines, raccoons, black bears, a wide variety of birds, lizards, and insects, along with many dogs and cats. They have been my teachers and healers. They have made it clear to me that they were here first and that I am a transient on their turf. I have almost stumbled into mountain lions and have watched red foxes playing right in front of my office door. Adult bears and their young have played outside my kitchen window. I feel blessed to have had these and other experiences, and if I need to make changes in how I live to accommodate these creatures, it is just fine with me.

Simply being in the presence of animals provides me with not only pure joy but also access to a major source of nature's wisdom. As I stir in bed each morning I am able to look out at beautiful mountains and trees. Depending on the time of year, I may be blessed with melodious birdsong, the pungent odor of a skunk, the howling of coyotes, insects buzzing here and there, or the soothing sound of rushing water. I often shed tears of joy at the privilege of awakening into nature's heart and arms, into nature's generous and warm blanket of sensuality. As I write this it is June, and I hear the rushing of Boulder Creek below my house and see and hear violet-green swallows nesting in the eaves of my house. These small and happy birds begin each day by taking flight and playing with one another, chasing one another and wrestling in the grass. As I watch them I find myself smiling and thinking how wise it is to begin each day with play. These swallows know how to face the day.

After breakfast I take a stroll with my companion dog, Jethro, near my mountain home. This is "his time," and I follow him and let him do what he wants to do. Jethro is a very large part-German shepherd, part-Rottweiler, whom I had the good fortune of meeting at the Boulder Humane Society. He is very relaxed, trusting, passionate, peaceful, and well-mannered. Jethro is a dog of few barks, but when he speaks it behooves me and others to listen well, for his messages are drenched with insights into, among other matters, human nature. I let him speak freely, for I am ultimately his

(and other animals') voice in matters concerning his life, and I want to know what he has to say. His language is richer and deeper than mere words. It continues to astound me, even after decades of living with and studying animals, how Jethro can tell me so much by simple and small movements of his eyes, ears, tail, or body.

Many ideas come to me early in the morning as I listen to birds sing, the occasional coyote howl, and the water in Boulder creek rush by. A resident family of red foxes frequently shows itself, skunks greet me with their pungent odor, mule deer casually browse outside my kitchen window, and if I am lucky I catch a glimpse of a wandering black bear or mountain lion. I try to sense the world through the eyes, ears, and noses of these amazing animals. I ask "What is it like to be another animal?" Animals are a way of knowing.

So may be trees. A few years ago I had a window installed in my office that allows me to look at a magnificent ponderosa pine tree. When I asked my friend to do the carpentry he was incredulous: "You'll just see the darned tree," he told me, as if I did not know. "I know," I told him. "I love trees! I can see mountains from other windows, but seeing and feeling the presence of this tree makes me feel good—makes me smile—makes me appreciate all of nature." Often I just sit and stare at "tree" and wonder what she is feeling. I often ask "tree" what she thinks. Her bark is rich with life; insects and birds visit her regularly for nourishment and protection. Trees provide all sorts of comfort for many animals. I ache when I think of a tree being felled for no good reason. A 17-year-old girl in a juvenile detention facility once told me that she is thankful for trees, for she feels safe when she is with them but not with people or most animals. "Trees don't judge me or talk back," she told me. Julia Butterfly Hill recognized this as she chose to live high in a 180-foot-tall California Coast Redwood tree she named Luna for more than two years. Trees can be soothing and stalwart companions.

One day as I rode my bicycle to the university I was fortunate enough to see two red foxes. The path I chose goes up a steep dirt road surrounded by ponderosa pine trees, where I have had the pleasure of meeting many deer, coyotes, squirrels, birds, and friendly dogs, and then drops down into Sunshine canyon, where I can descend at upwards of 50 miles per hour and enjoy the wind on my face. As I was climbing the dirt road I looked ahead and saw a small red fox running down the road on my left. He stopped, urinated, and then continued on his merry way. His tail was high and wagging and his gait light and frisky. Then, immediately on my right, I saw another red fox whose tail was going around like a propeller and who was emitting almost inaudible high-pitched whines. The foxes came together on the run and greeted one another effusively. They licked one another's muzzle, their tails wagging so rapidly they could have become airborne, their whines a melodious crescendo, and then they took off over

the side of the road. Seeing and feeling the presence of these happy foxes made me feel great and healed all the mental strife I had experienced looking for this paper or that paper or a book that I had probably long since given away. Just the previous month I had seen a fox bury another fox near my house. Animals can be healers, and I was fortunate to have had such a wonderful natural remedy for a hectic morning.

MINDING ANIMALS AND MINDING EARTH: DEEP ETHOLOGY

I developed the notion of "minding animals" because it emphasizes how important animals are to me and how important it is to try hard to take their point of view on their worlds. I use the expression "minding animals" in two ways. First, it refers to caring for other animals, respecting them for who they are, appreciating their worldviews, and wondering what and how they are feeling and why. Second, it refers to the fact that many animals have very active and thoughtful minds. In many of the same ways we can also "mind Earth." We must care for her and appreciate, respect, protect, and love her and also recognize that Earth and all of her inhabitants are somehow mindfully engaged because of interdependent interactions among them. Minding animals and minding Earth should cause us to wise up.

I call myself a "deep ethologist." I, as the seer, try to become the seen. I become coyote, I become penguin. I also become tree, and often I become rock. I name my animal friends and try to step into their sensory and motor worlds to discover what it might be like to be them—how they sense their surroundings and how they move about and behave in certain situations.

Moving toward a Heartful Science. I have a number of goals that I would like to accomplish in my short life on Earth. Some of my ideas have been presented in previous papers and books; others are constantly being revisited and revised as I ponder what animals can teach us about nature's wisdom. Some of the very ideas about which I write now will metamorphose when I revisit this essay and discuss it with colleagues. These dynamic and challenging topics with which I am concerned keep me working feverishly to gain a coherent perspective. There are many ways to travel the path of nature's wisdom and to learn about her sagacious ways, and I want to convince you that one path travels directly through the hearts and minds of our animal kin and that we can learn much about nature's wisdom if we open our hearts and minds to her prudent ways.

Given what some people do to animals, I sometimes wish that they were not as sentient and wise as they are. It is essential that heartless science be replaced with heartful and compassionate science and that all scientists take seriously the need to be socially responsible and share their findings

with the community at large. In my view, we need much more than traditional science (science that is not socially responsible, that is autonomous and authoritarian, that fragments the universe and disembodies and alienates humans and other animals) in order to make headway into understanding other animals and the world at large. We need to broaden science to incorporate heart and spirit. Science needs to open its arms to people who love the world and who have a reverence for all life. We need a science of unity, reconciliation, and compassion.

Suggested Rules of Engagement: Goodwill, Mercy, Magic, and Wisdom

Humans are part of nature. We are deeply embedded in nature and do not stand above or to the side of other natural processes. There is no duality, no "them" and "us." Trying to separate our own reality from that of other nature causes much discontent and discord, for it is so very unnatural. Indeed, we are part of nature's wisdom, although at times it does not appear so.

Given who we are and that we are all over Earth, we do indeed have the power to dominate nature. Thus, our animal kin depend on our goodwill, mercy, and wisdom. We hunt other animals, we eat them, we use them in education and research, and we let them entertain and amuse us. We also spread human diseases when we visit the places where animals live. Our relationship with other animals is usually very lopsided, with few if any benefits for the animals. We can choose to be intrusive, abusive, or compassionate. We do not have to do something just because we can do it. Each of us is responsible for our choices. We need to base our choices on (1) putting respect, compassion, and admiration for other animals first and foremost, (2) considering the animals' points of view, (3) erring on the animals' side when we are uncertain about their feeling pain, (4) recognizing that much research is fundamentally exploitative and that almost all of the methods that are used to study animals, even in the field, are intrusions on their lives, (5) recognizing how misguided are speciesistic views concerning vague notions such as intelligence and cognitive or mental complexity for informing assessments of well-being, (6) focusing on the importance of individuals, (7) appreciating individual variation and the diversity of the lives of individuals in the worlds within which they live, (8) appealing to what some call questionable practices in the conduct of science, such as the use of common sense and empathy, and (9) using broadly based rules of fidelity and nonintervention as guiding principles. A great challenge centers on how we reconcile common sense with "science sense."

There may well be some studies that we want to do but cannot because there is no ethically defensible way to conduct them, at least not now. And there just have to be some places that we leave be. Environmental ethicist

Holmes Rolston has this to say about Antarctica, a continent that is attracting more and more attention (like an unknown or an appealing animal in a cage in a zoo often does), one that could easily be taken over by humans: ". . . here is one continent on the home planet that is not, cannot, and ought not be our home" (Rolston 2002, 134). I agree. Let us preserve Antarctica's integrity as much as we can; let us honor this magnificent continent. I studied Adélie penguins and south Polar Skuas there in the 1970s. During that time my interests in science and ethics were kindled, and these concerns have been important to me ever since. I often asked myself as I walked among the penguins, "What in the world am I doing here?"

Animal Behavior and Nature's Wisdom

The study of animal behavior, especially animal cognition and animal emotions, can help us learn not only about nature's wisdom but also about our own (see Bekoff, Allen, and Burghardt 2002 and essays within). We can access much of nature's wisdom by studying animal emotions, the myriad ways in which animals display their unfettered and "unedited" pure passions. I often wonder whether our view of the world would be different had Charles Darwin been female and certain instances in which competition is invoked were viewed instead as cooperation. The following examples, I believe, demonstrate animal prudence, insight, and discretion.

Erudite Elephants. Few people would be surprised to read about nature's wisdom as instantiated by elephants. These magnificent beasts are known to be socially intelligent, to possess amazing memory, and to experience rich and deep emotions. The older an elephant is, the wiser she is, and the more critical her presence to her social group. Long-term field work with African elephants (1,700 individuals observed over 28 years) by Karen McComb and her colleagues (2001) working on the Amboseli Elephant Project in Southern Kenya resulted in the discovery that the removal of older and more experienced females—often the targets of hunters looking for ivory—has serious consequences for endangered populations of these animals. The social knowledge that is accumulated over long years plays a direct role in enhancing per capita reproductive success for groups of female elephants led by older individuals. Families with older matriarchs are better at interpreting sounds from other groups and discriminating between familiar and unfamiliar females in the vicinity. Might we say that aged elephant matriarchs are wise? Is there a collective wisdom of elephant clans? Can we speak of erudite elephants? I dare say we can.

Rhesus Monkeys: Playing Dumb. Christine Drea and Kim Wallen (1999) have discovered that low-ranking rhesus monkeys will "play dumb" in certain social situations. It is anthropocentrically arrogant to assume

that animals other than humans do not control their behavior according to who is watching. Drea and Wallen studied monkeys as they learned to discriminate boxes that contained food from those that did not. They compared the performance of monkeys tested in the presence of all members of their social group with their performance in groups of only more dominant or only more subordinate monkeys. They then reversed the situation and tested monkeys on the same problem: those previously tested in the company of only dominant individuals were then tested in the company of only subordinate monkeys and vice versa.

The results of this creative study are very interesting. Dominant monkeys performed well in all conditions, but subordinate monkeys performed well only when they were apart from higher-ranking animals. Because all of the monkeys had previously learned the task, Drea and Wallen concluded that the subordinate monkeys were playing dumb, voluntarily inhibiting their behavior depending on who was around. Subordinates who learned the discrimination when alone showed a performance decline when intimidating, higher-ranking animals were nearby. Had monkeys been studied only in the presence of dominant individuals, Drea and Wallen might have concluded that subordinate individuals were dumber than dominant animals, not that they were playing dumb for good reasons.

There also is recent evidence that animals know when they do not remember something and choose not to allow themselves to be tested in the future (Hampton 2001). Two rhesus monkeys were presented with four visual patterns, one of which they had seen previously. If they touched the correct image, the one they had seen previously, they received a highly preferred food; if they made an incorrect choice they did not receive any food. However, before they were retested the monkeys were allowed to choose whether they wanted to be retested by either responding to an image that caused the test images to appear or by responding to an image that gave them less preferred food but did not let them engage in the test. The two monkeys avoided a test when they did not think that they remembered the correct choice, declining to be tested when they were unlikely to choose the correct image.

Studies with Chimpanzees and Wolves. Recently, Brian Hare, along with Josep Call and Michael Tomasello (2001), asked the question "Do chimpanzees know what other chimpanzees know?" Because chimpanzees rely heavily on vision to acquire information, they wanted to learn whether chimpanzees show an understanding of what others can and cannot see. Anecdotes suggest that they are well aware of what others can see. Jane Goodall observed a chimpanzee refrain from retrieving or even looking at fruit when other chimpanzees were present, only to retrieve it after the others left. Susan Townsend discovered that wolves refrain from caching or retrieving food when other wolves are present. Chimpanzees will also

hide parts of their body, for example, using a facial expression called the "fear grimace," so that others will not see that they are afraid.

Scientists want more than fascinating stories, so Hare and his colleagues performed a set of clever experiments to ascertain whether seeing leads to knowing. Chimpanzees can potentially learn something about what other chimpanzees know by watching the direction of their gaze. Hare and his colleagues set up a situation in which a dominant and a subordinate chimpanzee competed for food. Wild chimpanzees normally compete for food, so this is a natural situation; they did not have to be trained in an unnatural context. In some instances dominant chimpanzees did not see food being hidden. If they did, the food was moved elsewhere when they were not looking. Subordinate chimpanzees always saw the food being hidden or moved and could see what their dominant friends saw.

Hare and his colleagues discovered that subordinate chimpanzees were aware of what dominant animals did or did not see. Subordinates retrieved food that dominant chimpanzees had not seen hidden or moved. Hare and his colleagues also found that not only could subordinate chimpanzees keep track of what other individuals knew, but they could also keep track of who had seen what. When a dominant chimpanzee who had witnessed the hiding or moving of food was replaced with another chimpanzee who had not, subordinate chimpanzees knew that the naive chimpanzee did not know where the food was, and they retrieved it.

These and other experiments show that chimpanzees know what other group members have and have not seen and what they do and do not know, and that they use this information to make future decisions.

Many people might throw up their hands and say, So what? Is it not obvious that chimpanzees and other animals must know what others know so that they don't have to waste time discovering everything on their own? Yes, but what is exciting is that these "naturalistic" ecologically relevant studies support stories about wild chimpanzees. Natural history has an important place in studies of animal behavior. Similar studies on other species are needed, for it is unlikely that only chimpanzees are so wise. In many cases animals are as wise as our methods of study allow them to be. We need to be clever enough to tap into how they do things in their worlds, not ours.

Self-Medication in Primates. Another intriguing activity is that of self-medication, or zoopharmacognosy, in which animals choose to eat plants that can help them control parasites and give relief from upset stomachs. There are plant-secondary compounds and bark that, when ingested, can provide such relief and are otherwise non-nutritional.

Michael Huffman (1997; 2001), a professor at the Primate Research Institute at Kyoto University in Japan, has studied self-medication in chimpanzees in various East African populations. He discovered that some

chimpanzees eat a plant that the local people know has medicinal effects. Once, a female named Chausiku fell ill. When others fed she slept. At a later time, when she was traveling with her troop, she stopped and peeled the bark off a mjonso tree and chewed on the pith. She then spat out the fibrous material and swallowed the juice. The bark of the mjonso tree is very bitter, and this was the first time that Huffman had seen a chimpanzee eat this plant. Huffman's local collaborator, Mohammed S. Kalunde, a national park game officer and herbal healer, told him that it had medicinal qualities. Kalunde's people, the WaTongwe, use the plant to treat various gastrointestinal disorders including malaria, parasitic infections, and upset stomachs. The plant, in fact, is used widely across Africa by millions of people to treat many of the same symptoms displayed by Chausiku.

Chausiku was self-medicating, using the bark to help herself recover. The next day Chausiku was back to normal, eating ginger, figs, and grass. Bonobos and gorillas also are practiced "pharmacists."

Another interesting discovery entailed a comparison of different populations of chimpanzees. Apes of the same species who live in neighboring troops or in other populations tend to use many of the same or related species of plants. Different ape species also use many of the same or related species of plants. These observations suggest that all apes use some common criteria when they choose plants for self-medication. It is possible that they come to associate the rough hairy surfaces of the medicinal plants or their odors with feeling better after ingestion.

Huffman notes that one of the most challenging questions facing future studies of zoopharmacognosy deals with how individuals acquire the habit. Not only do individuals have to choose the correct plant, they also have to know which parts of the plant to ingest and how to obtain them. There are a number of possibilities.

First, choosing the correct plant and associated parts may be innate: there may be an inborn predisposition to select the right plant for a given illness. While this seems unlikely with such complex behavior patterns as plant selection, there would be a premium on doing it correctly the first time so that an illness did not progress to the point of being seriously debilitating or fatal. It may also be that individuals have the ability to choose what they see others eat when they are sick. Huffman suggests that youngsters might learn what foods can help them feel better by watching what their mothers eat when they are ill. Indeed, infants have been observed to imitate their mothers immediately after they have fed on a particular medicinal plant. It is not only a matter of what she eats but how she eats it. It also could be that apes try different foods when they are ill, and when they feel better they associate their improved health with a particular food. Studies of taste aversions have shown that many animals, even white rats, are able to associate the taste of a specific food with how

their stomachs feel. Human infants regularly make these associations in the absence of "knowing" that they are doing so.

The chimpanzees' path to wisdom concerning self-medication remains to be determined. As with many other interesting behavior patterns, there is an air of mystery surrounding zoopharmacognosy. How do apes and other animals learn what to eat when they are sick, and how do they come to associate a specific plant with a specific illness? What is the role of cultural tradition in the development and maintenance of plant choice? These questions are very difficult to study in the field. Self-medication occurs rarely and unpredictably, it is very difficult to follow sick individuals over a period of time, and experimental manipulations are difficult to perform.

The Evolution of Social Morality

There are many areas in which scientists can pursue interesting and important questions about the wisdom of animals. One such area concerns the evolution of social morality. People sometimes wonder whether animals have codes of social conduct that regulate their behavior in terms of what is and is not permissible during social encounters. They want to know what the moral capacities of animals are—are animals moral agents with a moral sense who are able to live in moral communities? Charles Darwin's (1859; [1872] 1998) ideas about evolutionary continuity—that behavioral, cognitive, emotional, and moral variations among different species are differences in degree rather than in kind—are often invoked in such exercises. This view argues that there are shades of gray among animals and between nonhumans and humans, that the differences are not black and white.

The study of the evolution of morality, specifically cooperation and fairness, is closely linked to questions about animal wisdom and also is associated with ideas about continuity and discontinuity (the possible uniqueness of humans and other species), individuality, and freedom. It also is important to consider relationships between science, religion, and God, because spirituality and the notion of one form of God or another had strong influences on the evolution of the cognition, emotions, and morality of our ancestors.

Evolutionary reconstructions of social behavior often depend on educated guesses about the past social (and other) environments in which ancestral beings lived. It is impossible to know with certainty very much about these variables and how they may have figured into evolutionary scenarios. However, detailed comparative analyses of social behavior in animals can provide insights into the evolution of social morality. To be sure, these sorts of studies are extremely challenging, but the knowledge that is gained is essential in our efforts to learn more about the evolution of sociality and social morality and to learn more about human nature and perhaps human uniqueness.

The notion of "behaving fairly" is the notion that animals often have social expectations when they engage in various sorts of social encounters the violation of which constitutes being treated unfairly because of a lapse in "social etiquette." I explore this below in my discussion of social play behavior. (Much of the following is from Bekoff 2002.)

Cooperation and Fairness. In my view, cooperation is not always merely a by-product of tempering aggressive and selfish tendencies (combating Richard Dawkins's selfish genes) and attempts at reconciliation. Rather, cooperation and fairness can evolve on their own, because they are important in the formation and maintenance of social relationships. This view, in which nature is sanitized, contrasts with that which sees aggression, cheating, selfishness, and perhaps amorality as driving the evolution of sociality. The combative Hobbesian world in which individuals are constantly at one another's throats is not the natural state of affairs; nature is not always "red in tooth and claw," and altruism is not always simply selfishness disguised.

It feels good to be nice to others, to cooperate with them, to treat them fairly, and to forgive them for their mistakes and shortcomings. Studies of the evolution of social morality also need to consider the rich cognitive (intellectual) and deep emotional lives of other animals. Skeptical dismissals that animals are nothing but nonsentient automatons are dead ends. While one cannot prove without doubt that some animals have rich cognitive and emotional lives, it also is impossible to prove that they do not. Perhaps we need to change our research strategies and assume that many animals are indeed able to make conscious choices and do experience emotions and then have to prove that they do not, rather than assume that animals are not able to make conscious choices and experience emotions and then have to prove that they do. Erring on the side of animals is a wise choice.

According to His Holiness The Dalai Lama (2002, 69), "Telling lies requires a degree of sophistication; it entails an ability to anticipate the effects of one's action. I would be surprised if we could perceive such artificiality in any animal species. To me this indicates a certain innate disposition toward justice and honesty, beyond what we understand as religious or conventional morality." And Charles Darwin writes, "Happiness is never better exhibited than by young animals, such as puppies, kittens, lambs, &c., when playing together, like our own children" ([1871] 1936, 448).

Animal play is obvious, but animal social morality is not. Social play in animals is an exhilarating activity to engage in and to observe. The rhythm, dance, and spirit of animals at play is contagious. Not only do their animal friends want to join in or find others with whom to romp, but when I see animals chasing one another, playing hide-and-seek, and wrestling with

reckless abandon, I also want to play. I once watched a young elk in Rocky Mountain National Park, Colorado, running across a snow field, jumping in the air and twisting his body while in flight, stopping to catch his breath, and then jumping and twisting over and over and again, and my body tingled with delight. There was plenty of grassy terrain around, but he chose the snow field. Buffalo will follow one another and playfully run onto and slide across ice, excitedly bellowing "Gwaaa" as they do so. We all know that dogs and cats love to play, as do many other mammals. Birds also soar across the sky, diving here and there, chasing and frolicking with one another.

I think of play as being characterized by what I call the "Five S's of Play"—Spirit, Symmetry, Synchrony, Sacredness, and Soulfulness. The Spirit of play is laid bare for all to see as animals run about, wrestle, and knock one another over. The Symmetry and Synchrony of play are reflected in the harmony of the mutual agreements to trust one another; individuals share intentions to cooperate with one another to prevent play from spilling over into fighting. This trust is Sacred. Finally, there is a deepness to animal play in that the players are so immersed in play that they *are* the play. Play is thus a Soulful activity, perhaps the essence of individuals' being at the moment as they play. As Thomas Aquinas once noted, play is about being; there are no whys in play.

There is also a feeling of incredible freedom and creativity in the flow of play. So it is important also to keep in mind the six F's of play—Flexibility, Freedom, Friendship, Frolic, Fun, and Flow. Animals run about, jump on one another, somersault, and bite one another. The emotions associated with play—joy and happiness—drive animals into becoming at one with the activity. One way to get animals (including humans) to do something is to make it fun, and there is no doubt that animals enjoy playing. Studies of the chemistry of play support the claim that play is fun. Dopamine (and perhaps serotonin and norepinephrine) are important in the regulation of play. Rats show an increase in dopamine activity when anticipating the opportunity to play and enjoy being playfully tickled. There also is a close association between opiates and play.

Communication in Play. When animals play they typically use behavior patterns that also are used in other contexts, such as predatory behavior, antipredatory behavior, and mating. These actions may not vary much across different contexts, and they may be hard to discriminate even for the participants. How do animals know that they are playing? How do they communicate their desires or intentions to play or to continue to play? How is the play mood maintained?

Because behavior patterns that are performed during ongoing social play can be misinterpreted, individuals need to tell others "I want to play," "this is still play no matter what I am going to do to you," or "this is still play

regardless of what I just did to you." An agreement to play rather than fight, mate, or engage in predatory activities can be negotiated in various ways. Individuals may use certain behavior patterns—play markers—to initiate play or to maintain a play mood by punctuating play sequences with these actions when it is likely that a particular behavior may have been, or will be, misinterpreted. It is also possible that there are auditory, olfactory, and tactile play markers. I have found that play signals in infant canids (dogs, wolves, and coyotes) are used nonrandomly, especially when biting accompanied by rapid side-to-side shaking of the head is performed. This behavior pattern occurs during serious aggressive and predatory encounters and can easily be misinterpreted if its meaning is not modified by a play signal. There is little evidence among canids or other species that play signals are used to deceive others. Cheaters are unlikely to be chosen as play partners. Personal observations of infant coyotes show that cheaters have difficulty getting other young coyotes to play. It is not known whether individuals select play partners based on what they have observed during play by others.

Individuals also engage in role-reversing and self-handicapping behavior to maintain social play. Each reduces asymmetries between the interacting animals and fosters the reciprocity that is needed for play. Self-handicapping happens when an individual behaves in a way that might compromise herself. For example, a coyote might not bite her play partner as hard as she can, or she might not play as vigorously as she can.

Role reversal occurs when a dominant animal does something during play that would not normally occur during real aggression. For example, a dominant animal might not voluntarily roll over on his back during fighting but would do so while playing. Role reversal and self-handicapping behavior might occur together: a dominant individual might roll over while playing with a subordinate animal and also back off on the intensity of a bite. From a functional perspective, self-handicapping and role-reversing behaviors, using specific play invitation signals, and altering behavioral sequences would all signal an individual's intention to continue to play.

Fair Play. For years I tried to figure out why play evolved as it did. Why do animals carefully use play signals to tell others that they really want to play and not try to dominate them, and why do they self-handicap and reverse roles? One morning, while hiking with Jethro, I had an "aha" experience, and the puzzle was solved. I realized that during social play, while individuals are having fun in a relatively safe environment, they learn ground rules that are acceptable to others—how hard they can bite, how roughly they can interact—and how to resolve conflicts.

There is a premium on playing fairly and trusting others to do so as well. It is wise to play fairly. There are codes of social conduct that stipulate actions that are and are not permissible, and the existence of these

codes likely speaks to the evolution of social morality. What could be a better atmosphere in which to learn social skills than social play, where there are few penalties for transgressions? Individuals might also generalize codes of conduct learned in playing with specific individuals to other group members and to other situations such as sharing food, defending resources, grooming, and giving care.

Play time generally is safe time; transgressions and mistakes are forgiven and apologies accepted by others, especially when one player is a youngster who is not yet a competitor for social status, food, or mates. There is a certain innocence in play. Individuals must cooperate with one another when they play—they must negotiate agreements to play. Detailed studies of play in various species indicate that individuals trust others to maintain the rules of the game. While there have been numerous discussions of cooperative behavior in animals, none has yet considered social play—the requirement for cooperation and reciprocity—and its possible role in the evolution of social morality, namely, behaving fairly.

Individuals of different species seem to fine-tune ongoing play sequences to maintain a play mood and to prevent play from escalating into real aggression. Detailed analyses of film show that in canids there are subtle movements and rapid exchanges of eye contact that suggest that players are exchanging information on the run, from moment to moment, to make certain everything is all right, that this is still play.

I do not argue that there is a gene for fair or moral behavior. As with any behavioral trait, the underlying genetics is bound to be complex, and environmental influences may be large. No matter. Provided that there is variation in levels of morality between individuals, and provided that virtue is rewarded by a greater number of offspring, any genes associated with good behavior are likely to accumulate in subsequent generations. That play is rarely observed to be unfair or uncooperative is surely an indication that natural selection acts to weed out those who do not play by the rules.

Animal Emotions

It is hard to watch elephants' remarkable behavior during a family or bond group greeting ceremony, the birth of a new family member, a playful interaction, the mating of a relative, the rescue of a family member, or the arrival of a musth male, and not imagine that they feel very strong emotions which could be best described by words such as joy, happiness, love, feelings of friendship, exuberance, amusement, pleasure, compassion, relief, and respect. (Poole 1998, 90–91)

It is remarkable how often the sounds that birds make suggest the emotions that we might feel in similar circumstances: soft notes like lullabies while calmly warming their eggs or nestlings; mournful cries while helplessly watching an intruder at their nests; harsh or grating sounds while threatening or attacking an enemy. . . . Birds so frequently respond to events in tones such as we might use that we suspect their emotions are similar to our own. (Skutch 1996, 41–42)

Coming to understand and appreciate animal emotions is a path to learning about nature's wisdom. In this section I consider joy, grief, and love; however, there are many other emotions that could be discussed, including anger, embarrassment, jealousy, and fear. Michael Tobias, a filmmaker, author, and ecologist, once found himself swimming with gigantic whale sharks and was struck by their gigantic heart, gentleness, and nonviolence. Their gentleness was so contagious that Tobias was "completely severed from time" and "unsnarled from all connections" (2000, 172). He felt a strong connection with Nacho, a whale shark named by a local doctor. The unfiltered emotions that exuded from Nacho were the basis for developing a trust and fellowship of mutual admiration. One reason that many animals are able to form close and reciprocal social bonds with one another (and with humans) is shared emotions.

When Shirley Met Jenny. Elephants have strong feelings. They experience joy, grief, and depression and mourn the loss of their friends. Elephants live in matriarchal societies in which strong social bonds among individuals endure for decades. They also have great memory. Shirley and Jenny, two female elephants who were reunited after living apart for many years, showed that they had missed one another when they were separated. At different times, each was brought to the Elephant Sanctuary in Hohenwald, Tennessee (founded and run by Carol Buckley) so that they could live out their lives in peace, away from the entertainment industry. When Shirley and Jenny were introduced at the sanctuary, there was an urgency in Jenny's behavior. She wanted to get into the same stall with Shirley. Loud roars emanated from each elephant. Far from being cautious and uncertain about one another, they touched one another through the bars separating them and remained in close contact. Their keepers were intrigued by how outgoing each was. A search of records showed that Shirley and Jenny had lived together twenty-two years before in the same circus, when Jenny was eight years old and Shirley was thirty. They still remembered one another when they were inadvertently reunited.

A Mother's Devotion. Cynthia Moss, who has studied the behavior of wild African elephants for more than three decades, tells the following story of a mother's devotion. The gestation period for elephants is twenty-two months, and a female gives birth to a single calf every four to five years. Mothers lactate to provide food for about four years. In 1990, Moss made a film about a family of elephants called the EBs, whose leader, Echo, was a "beautiful matriarch." Echo gave birth in late February to a male, Ely, who could not stand up because his front legs were bent, his carpal joints rigid. Echo continuously tried to lift Ely by reaching her trunk under and around him. Once Ely stood, he shuffled around on his knees for a short while and then collapsed to the ground.

When other clan members left, Echo and her nine-year-old daughter, Enid, stayed with Ely. Echo would not let Enid try to lift Ely. Eventually the three elephants moved to a water hole, and Echo and Enid splashed themselves and Ely. Despite the fact that Echo and Enid were hungry and thirsty, they would not leave an exhausted Ely. After three days, Ely finally was able to stand.

Echo's devotion paid off: Ely is now twelve years old. But there is more to this story, details that could be gathered only by conducting long-term research on known individuals. When Ely was seven years old, he suffered a serious wound from a spear that was embedded about one foot into his back. Although Echo now had another calf, she remained strongly bonded to Ely and would not allow a team of veterinarians to tend to him. When Ely fell down after being tranquilized, Echo and other clan members tried to lift him. Echo, Enid, and another of Echo' daughters, Eliot, remained near Ely despite attempts by the veterinarians to disperse the elephants so that they could help Ely. The elephants refused to leave despite gunshots being fired over their heads. (Eventually Ely was treated, and he survived the injury.)

The study of animal emotions is important, because not only does it allow us to appreciate the lives of many of the animal beings with whom we share this splendid planet, it also helps us come to terms with how we "mind" them—how we treat them. Animals can form tight and reciprocal social bonds with one another and with humans because of shared emotions. Emotions are the glue for the development and maintenance of these bonds.

Grief.

> Never shall I forget watching as, three days after Flo's death, Flint climbed slowly into a tall tree near the stream. He walked along one of the branches, then stopped and stood motionless, staring down at an empty nest. After about two minutes he turned away and, with the movements of an old man, climbed down, walked a few steps, then lay, wide eyes staring ahead. The nest was one which he and Flo had shared a short while before Flo died. . . . [I]n the presence of his big brother [Figan], [Flint] had seemed to shake off a little of his depression. But then he suddenly left the group and raced back to the place where Flo had died and there sank into ever deeper depression. . . . Flint became increasingly lethargic, refused food and, with his immune system thus weakened, fell sick. The last time I saw him alive, he was hollow-eyed, gaunt and utterly depressed, huddled in the vegetation close to where Flo had died. . . . [T]he last short journey he made, pausing to rest every few feet, was to the very place where Flo's body had lain. There he stayed for several hours, sometimes staring and staring into the water. He struggled on a little further, then curled up—and never moved again. (Goodall 1990, 196–97)

Many animals display grief at the loss or absence of a close friend or loved one. One vivid description is offered above. Nobel laureate Konrad Lorenz observed grief in geese that seemed similar to grief in young children. He provided the following account: "A greylag goose that has lost its

partner shows all the symptoms that John Bowlby has described in young human children in his famous book *Infant Grief* . . . the eyes sink deep into their sockets, and the individual has an overall drooping experience, literally letting the head hang" (Lorenz 1991, 251).

Other examples of grief are offered in my book *The Smile of a Dolphin* (2000). Sea lion mothers watching their babies being eaten by killer whales squeal eerily and wail pitifully. Dolphins have been observed struggling to save a dead infant. Elephants have stood stand guard over a stillborn baby for days with their head and ears hanging down, quiet and moving slowly. Orphan elephants who saw their mothers being killed often wake up screaming. Joyce Poole (1998) claims that grief and depression in orphan elephants is a real phenomenon. It has also been noted of traumatized orphaned gorillas: "The light in their eyes simply goes out, and they die" (McRae 2000, 86). Comparative research in neurobiology, endocrinology, and behavior is needed to learn more about the subjective nature of animal grief.

Romantic Love. Courtship and mating are activities in which numerous animals regularly engage. Many animals seem to "fall in love" with one another, as humans do. Bernd Heinrich (1999) is of the opinion that even ravens fall in love. In many species, romantic love slowly develops between potential mates.

Bernd Würsig (2000) describes a courtship between southern right whales off Peninsula Valdis, Argentina. Aphro (female) and Butch (male) were observed as they continuously touched flippers, began a slow caressing motion with them, rolled toward each other, briefly locked both sets of flippers as in a hug, and then rolled back up, lying side by side. They then swam off, side by side, touching, surfacing and diving in unison. Würsig followed Butch and Aphro for about an hour, during which they continued their tight travel. Würsig believes that Aphro and Butch became powerfully attracted to each other. He asks, Could this not be leviathan love?

It is unlikely that romantic love (or any emotion) first appeared in humans with no evolutionary precursors in animals. Indeed, there are common brain systems and homologous chemicals underlying love (and other emotions) that are shared between humans and other animals. The presence of these neural pathways suggests that if humans feel romantic love, at least some other animals may also experience this emotion.

The Power of Eye Contact. Animals communicate using a number of different sensory modalities either singly or in combination with one another. We see their visual displays, we hear their melodious and not-so-melodious vocalizations, and we smell the odors which they selflessly share with us. But it is their eyes (if they have them) that frequently seem to tell us how they feel about a particular situation; it is their eyes that pierce us when they appear to be experiencing joy, grief, or pain.

My good friend and colleague Jane Goodall (1999) tells a compelling story about the power of eyes, of the gaze of those who depend on us for their own well-being. It is about a chimpanzee called JoJo who was born in Africa. When he was about two years old his mother was shot, and JoJo was taken from her and shipped to America. For many years he lived alone in a small, barren cage. Eventually money was raised to build a large enclosure, surrounded by a moat (chimpanzees cannot swim). Nineteen other chimpanzees were purchased, introduced to each other, and then released into the enclosure.

One day, one of the other males challenged JoJo, and he ran into the water. He managed to scramble over the fence intended to stop the chimps from drowning in the deep water beyond. Three times JoJo went under, then surfaced, gasping for air. Then he was gone. On the other side of the moat was a small group of people. A zoo visitor named Rick was there with his family, and while a keeper ran to get a long pole, Rick jumped into the water and swam until he touched JoJo's inactive body. Heaving the dead weight over his shoulder, he scrambled over the fence, pushed JoJo onto the shore of the exhibit, and started back toward his family. The human onlookers began screaming at Rick to hurry up. From their position above him they could see three big males, hair bristling, moving toward the scene. At the same time JoJo was sliding back into the water, because the bank was steep. A woman captured the scene on video. On the video we see Rick standing by the fence. He looks up toward JoJo, who is just vanishing into the water again. For a moment, Rick is motionless. Then he goes back, pushes JoJo up onto the land once again, and waits there, ignoring his frantic family, until JoJo manages to seize a clump of grass and pull himself away from the water. Just in time, Rick gets back over the fence.

The video was shown on many North American television stations the same evening. The director of the Jane Goodall Institute saw it, and he called Rick. "That was a very brave thing you did. What made you do it?" "Well, you see," replied Rick, "I happened to look into his eyes, and it was like looking into the eyes of a man. And the message was 'Will not anybody help me?'"

Toward a Compassionate Science

Lack of full scientific certainty should not be used as an excuse to delay taking action on some issue. This is known as "the precautionary principle" (Applegate 2000) and was developed by ecologists and environmentalists for use in making decisions about environmental problems. It can be well applied in studies of animal cognition, animal emotions, and the evolution of social morality. I believe that we know enough about animals to justify stopping the wanton destruction of their lives and of the places

where they live. Claiming that we do not now and will never know enough about them and using this uncertainty to continue our destructive ways is inexcusable.

> My prayer is that we "center down," for the sake of all the relations, for all of us. To be perfectly honest—and there can be nothing less—my prayer is that we *get down*, that we get down and dirty. I pray that we lose ourselves while lovemaking with dirt, with the rocks and streams, the salmon who swim there, the coyotes and 'coons, the water bugs and snakes—with the fertile ground of wherever we may be. (Sewall 1999, 274)

I am a hopeful person and a dreamer, and while I do think that we need to make better decisions about how we interact with nature than we have in the past and that things are getting better, I do not think that time is on our side. Thus, I argue that no one is exempt from blame for the intentional or unintentional destruction of nature's wisdom and spirit—and hence our own—no matter how rich or how removed from nature one becomes. We are a single community of Earth. I hope that one day we will all feel enveloped in a warm tapestry of oneness, a blanket in which respect, compassion, humility, grace, and love abound. We receive what we give, so we will never deplete the source of these attitudes and virtues. If I did not believe this, life would lose much of its meaning for me.

Holistic, heart-driven, compassionate science needs to replace impersonal, reductionist science. By studying animals and appreciating them for who they are we can come to terms with much of nature's wisdom and perhaps much of our own. My vision is the creation of a community in which we humans perceive ourselves as a part of nature and not apart from her, in which those of us who are overwhelmed and whose spirits have been squelched by living among steel, concrete, asphalt, noise, and a multitude of invasions of our private spaces reconnect with raw nature—with the wind in our faces, the fragrance of wildflowers, and the sounds, sights, smells, and touch of other animals and inanimate environs—a world in which sensing is feeling. Reconnecting with nature can help us overcome alienation and loneliness. During my brief tenure on this wondrous planet, I am more than happy to open the door of my heart to all beings. My own spirituality is based on a deep drive for a seamless unity. I envision a unified, peaceable kingdom based on kinship, kindness, and generosity.

Moving Toward a Soul-scape. I am a hard-core optimist. I ache with the pains of other beings and feel pangs when I see inanimate landscapes being destroyed, but I remain hopeful that we can make this a better world for ourselves, our children, and their children, because we are a very special species (but not *better* than other species).

It is essential to maintain hope even when things seem grim. It is disturbing to imagine a world in which humans and other life coexist in the absence of any intimacy and interconnectedness. Surely we do not want to

be remembered as the generation that killed nature. Now is the time for everyone to work for universal planetary peace—with other humans, other animals, and all of nature.

In the end, in my opinion, it boils down to love. The power of love must not be underestimated as we try to reconnect with nature and other animals. We can love animals more and not love people less. We need to be motivated by love and not by fear of what it will mean if we come to love animals for who they are. Animals are not "less than human"; they are who they are and need to be understood in their own worlds. The study of animal behavior will help us immensely.

If we forget that humans and other animals are all part of the same interdependent world, the more-than-human world (Abram 1996), and if we forget that humans and animals are deeply connected at many levels of interaction, when things go amiss in our interactions with animals, as they surely will, and animals are set apart from and inevitably below humans, I feel certain that we will miss the animals more than the animal survivors will miss us. The interconnectivity and spirit of the world will be lost forever, and these losses will make for a severely impoverished universe.

Reductionism, Holism, and Heart. What goes around comes around. In the grand scheme of things, individuals receive what they give. If love is poured out in abundance it will be returned in abundance. "In reality there is a single integral community of the Earth. . . . In this community every being has its own role to fulfill, its own dignity, its inner spontaneity. Every being has it own voice. . . . We have no right to disturb the basic functioning of the biosystems of the planet. We cannot own the Earth or any part of the Earth in any absolute manner" (Berry 1999, 4–5).

It is important to recognize that each individual plays an essential role and that each individual's spirit and love are intertwined with the spirit and love of others. These interrelationships, which transcend individuals' embodied selves, foster oneness and can work in harmony to make this a better and more compassionate world for all. When animals and other wild nature lose, we all lose. Holism and universal compassion need to replace impersonal, cold, and objective reductionism, which alienates and disembodies individuals and fragments their hearts, spirits, and souls.

Reductionist science misrepresents the world—the world of people, the world of animals, the entire deeply interconnected community of Earth. This has serious consequences for the quality of knowledge we gather and for how we interact with nature. Reductionism promotes alienation, isolation, and disconnection. It forces a separation, a false dualism, between the seer and the seen. Reductionism leads us away from viewing animals' worlds as they view their own worlds and toward destructive anthropocentrism. Science often impedes our truly sensing, feeling, and understanding the scope of the amazing world within which we live. We live as if we

know with great certainty how whole systems work, but our knowledge is far from infallible.

Science can make nature appear less majestic, less magical, and less wise than she is. Holistic and more heart-driven science is needed, science that is infused with spirit, compassion, and love. Closet holists need to emerge and offer their heretical views. Holistic science reinforces a sense of togetherness and relationship, family and community, and awe. It fosters the development of deep and reciprocal friendships among humans, animals, and other nature. It helps us resonate with nature's radiance and lessens our tendency to think that we are at the center of everything. Berry (1999) stresses that we should strive to be a "benign presence" in nature. Native Americans are proud to claim that "animals are all our relations." Animals and inanimate things in nature need to speak for themselves. And we must listen to their messages very carefully. We need science with a heart, science that includes who we are as the human practitioners of the business of science, similar to what Buddhists call "dependent arising" (Harrington 2002, 27–28). Solid science *can* be driven by one's heartstrings. Saturating science with spirit and compassion will help bring science, nature, and society together into a unified whole. Questioning science will help ensure that we do not repeat past mistakes, that we move toward a world in which humans and other animals share peaceably and cherish the beneficence of nature. It is essential that we do better than our ancestors, and we surely have the resources to do so. The big question is whether we will make the proactive commitment to making this a better, more compassionate world, in which love is plentiful and shared, before it is too late.

We need to walk lightly, watching each and every step that we take, as we travel the path of nature's wisdom. When all is said and done (and usually more is said than done), I love to imagine that all nonhuman and human beings will come to live in a soul-scape bounded by and immersed in mutual compassion, respect, and love.

A Hierarchy of Compassion. "Compassion—surely that is what the earth seeks most in us" (Martin 1999, 192). Compassion and hope are essential for making this a better planet for all life. Alan Sponberg presents a useful model of compassion in his "hierarchy of compassion." His compelling view accentuates how we humans need to come to terms with who we are in a hierarchy of compassion. In his view, higher does not mean better but, rather, more responsible. In his hierarchy,

> . . . vertical progress is a matter of "reaching out," actively and consciously, to affirm an ever-widening circle of expressed interrelatedness . . . progress along this spiral path confers no increasing privilege over those who are below on the path. Quite the contrary, it entails an ever increasing sense of responsibility . . . for an ever greater circle of relatedness . . . expressed by the Buddhist term *karunā*—compassion or "wisdom in action." (1997, 366–67)

VISUALIZING COMPASSION: MINDING ANIMALS, MINDING EARTH

If we listen to the spirit of nature, we can consider human existence on this planet as companion, steward, and lover. As we learn about other animals and how important they are to us we learn more about ourselves. This knowledge and the intense feelings they bring forth will help make us nicer to one another and nicer to the planet as a whole. We need to do this now. Time is not on our side mainly because our big brains make us so powerful. Inextricably tied to that might is the responsibility to act in ethical ways.

We must move forward with grace, kindness, generosity, and humility. Nothing will be lost, and much will be gained. Surely, we want to know deep in our hearts that we did the best we could and took into account the well-being of the magnificent animals with whom we share Earth, the beings who make our lives richer, more challenging, and more enjoyable than they would be in the animals' absence. Continued disrespect, abuse, and relegation of animals to being victims of human greed and arrogance will make for a greatly impoverished world. By minding animals we mind ourselves. By minding Earth we mind ourselves and the entire integrated community of Earth.

Let us do no intentional harm Let us treat all individuals with compassion and step lightly into the lives of other beings, bodies of water, air, and landscapes. It will be difficult to achieve win-win solutions all of the time, but moral progress requires moral choices. Let us expand our relatively closed human clubhouse to incorporate all of Earth.

Giving, Receiving, and Giving Thanks. "What is the good life? The good life is to be a good neighbor, to consider your neighbor as yourself" (K. Vishwanathan, cited in Suzuki and Dressel 2002, 325). In the grand scheme of things, individuals receive what they give. As we come to understand and appreciate nature's wisdom we will move to protect her. Philosopher Mary Midgley has recently argued that science and poetry can be compatible bedfellows, that subjectivity is not scandalous, that holism is the wave of the future, and that there is unity to our lives. She notes that "we can resist the academic fashions that now fragment us" (2001, 1). Not only *can* we resist them, we *must*, for better science and for better tomorrows. Anthropocentrism needs to be replaced with biocentrism and egalitarianism. Nearly half of our splendid planet has been transformed so that there are "dead zones"—areas where there is little or no oxygen in coastal waters. The voice and the actions of every individual make a difference. Martin Luther King Jr. once said, "A time comes when silence is betrayal." He was right: silence and indifference can be deadly for our animal friends and for Earth.

The journey that I have taken here is actually *our* journey. There is much exciting, challenging, and enjoyable work to be done. I hope that I have convinced you that ethological studies are essential for learning about nature's wisdom, and that science, nature, kinship, and heart can coexist as we travel the path to nature's wisdom.

Thank you, wise Nature, for allowing us to enjoy your presence, your magic, and your gifts. Thank you, Nature, for sharing your wisdom. You are a wonderful teacher, a magical and often mysterious healer.

Now, let us heed her many lessons.

NOTE

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REFERENCES

Abram, David. 1996. *The Spell of the Sensuous: Perception and Language in a More-than-Human World*. New York: Pantheon.

Applegate, J. S. 2000. "The Precautionary Preference: An American Perspective on the Precautionary Principle." *Human and Ecological Risk Assessment* 6:413–43.

Bekoff, Marc, ed. 2000. *The Smile of a Dolphin: Remarkable Accounts of Animal Emotions*. Washington, D.C.: Discovery Books.

Bekoff, Marc. 2002. *Minding Animals: Awareness, Emotions, and Heart*. New York: Oxford Univ. Press.

Bekoff, Marc, C. Allen, and G. M. Burghardt, eds. 2002. *The Cognitive Animal*. Cambridge: MIT Press.

Berkes, Firket. 1999. *Sacred Ecology: Traditional Ecological Knowledge and Resource Management*. Philadelphia: Taylor and Francis.

Berry, Thomas. 1999. *The Great Work: Our Way into the Future*. New York: Bell Tower.

———. 2000. "Interview with Thomas Berry." *Wild Earth* (Summer), 93–97.

Carson, Rachel. 1962. *Silent Spring*. Boston: Houghton Mifflin.

Darwin, Charles. 1959. *On the Origin of Species*. London: Murray.

———. [1872] 1998. *The Expression of the Emotions in Man and Animals*. 3d ed. Introduction, Afterword, and Commentaries by Paul Ekman. New York: Oxford Univ. Press.

———. [1871] 1936. *The Descent of Man and Selection in Relation to Sex*. New York: Random House.

Drea, Christine M., and Kim Wallen. 1999. "Low-Status Monkeys 'Play Dumb' when Learning in Mixed Social Groups." *Proceedings of the National Academy of Sciences* 96:12965–69.

Goodall, Jane. 1990. *Through a Window: My Thirty Years with the Chimpanzees of Gombe*. Boston: Houghton Mifflin.

———. 1999. *Reason for Hope*. New York: Warner.

Gould, Stephen Jay. 2002. *The Structure of Evolutionary Theory*. Cambridge: Harvard Univ. Press.

Hampton, R. R. 2001. "Rhesus Monkeys Know when They Remember." *Proceedings of the National Academy of Sciences* 98 (9): 5359–62.

Hare, Brian, Josep Call,, and Michael Tomasello. 2001. Do Chimpanzees Know What Conspecifics Know?" *Animal Behaviour* 61:139–51.

Harrington, A. 2002. "A Science of Compassion or a Compassionate Science? What Do We Expect from a Cross-cultural Dialogue with Buddhism?" In *Visions of Compassion: Western Scientists and Tibetan Buddhists Examine Human Nature,* ed. R. J. Davidson and A. Harrington, 18–30. New York: Oxford Univ. Press.

Heinrich, Bernd. 1999. *Mind of the Raven.* New York: Cliff Street Books.

His Holiness the Dalai Lama. 1999. *The Path to Tranquility: Daily Wisdom.* New York: Viking Arkana.

———. 2002. "Understanding Our Fundamental Nature." In *Visions of Compassion: Western Scientists and Tibetan Buddhists Examine Human Nature,* ed. R. J. Davidson and A. Harrington, 66–80. New York: Oxford Univ. Press.

Huffman, Michael A. 1997. "Current Evidence for Self-Medication in Primates: A Multidisciplinary Perspective." *Yearbook of Physical Anthropology* 40:171–200.

———. 2001. "Self-Medicative Behavior in the African Great Apes: An Evolutionary Perspective into the Origins of Human Traditional Medicine." *BioScience* 51:651–61.

Krause, Bernie. 2002. "The Loss of Natural Soundscapes." *Earth Island Journal* (Spring).

Kumar, S. 2000. "Simplicity for Christmas and Always." *Resurgence* (November/December), 3.

Lorenz, Konrad Z. 1991. *Here I Am—Where Are You*? New York: Harcourt Brace Jovanovich.

Martin, Calvin Luther. 1999. *The Way of the Human Being.* New Haven: Yale Univ. Press.

McComb, Karen, C. Moss, S. M. Durant, L. Baker, and S. Sayialel. 2001. "Matriarchs as Repositories of Social Knowledge in African Elephants." *Science* 292 (No. 5516): 491–94.

McCrae, M. 2000. "Central Africa's Orphaned Gorillas: Will They Survive the Wild?" *National Geographic* 197 (2): 84–97.

McKinney, Michael L. 2001. "Role of Human Population Size in Raising Bird and Mammal Threat among Nations." *Animal Conservation* 4:45–57.

Midgley, Mary. 2001. *Science and Poetry.* New York: Routledge.

Miller, Henry. 1957. *Big Sur and the Oranges of Hieronymus Bosch.* New York: New Directions.

Moser, Anton. 2000. "The Wisdom of Nature in Integrating Science, Ethics and the Arts." *Science and Engineering Ethics* 6:365–82.

Poole, Joyce. 1998. "An Exploration of a Commonality between Ourselves and Elephants." *Etica & Animali* 9:85–110.

Rolston, Holmes III. 2002. "Environmental Ethics in Antarctica." *Environmental Ethics* 24:115–34.

Sewall, Laura. 1999. *Sight and Sensibility: The Ecopsychology of Perception.* New York: Tarcher/Putnam.

Skutch, Alexander. 1996. *The Minds of Birds.* College Station: Texas A&M Univ. Press.

Sponberg, Alan. 1997. "Green Buddhism and the Hierarchy of Compassion." In *Buddhism and Ecology,* ed. M. E. Tucker and D. R. Williams, 351–76. Cambridge: Harvard Univ. Press.

Streever, B. 2002. "Science and Emotion, on Ice: The Role of Science on Alaska's North Slope." *BioScience* 52 (No. 2): 179–84.

Suzuki, D., and H. Dressel. 2002. *Good News for a Change: Hope for a Troubled Planet.* Toronto, Canada: Stoddart.

Tobias, M. 2000. "A Gentle Heart." In *The Smile of a Dolphin: Remarkable Accounts of Animal Emotions,* ed. Marc Bekoff, 171–73. Washington, D.C.: Discovery Books.

Trungpa, Chögyam. 1988. *Shambhala: The Sacred Path of the Warrior.* Boston: Shambhala.

van den Born, R. et al. 2001. "The New Biophilia: An Exploration of Visions of Nature in Western Countries." *Environmental Conservation* 28:1–11.

Williams, T. T. 2001. *Red: Passion and Patience in the Desert.* New York: Pantheon.

Würsig Bernd. 2000. "Leviathan Lust and Love." In *The Smile of a Dolphin: Remarkable Accounts of Animal Emotions,* ed. Marc Bekoff, 62–65. Washington, D.C.: Discovery Books.